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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/551,219

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Marcus Steen

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YOUNG & THOMPSON

209 Madison Street

Suite 500

ALEXANDRIA, VA 22314

EXAMINER

COLEMAN, RYAN L

ART UNIT

PAPER NUMBER

1792

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DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/551,219	<b>Applicant(s)</b> STEEN ET AL.	
	<b>Examiner</b> RYAN COLEMAN	<b>Art Unit</b> 1792	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period **will** apply and **will** expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply **will**, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☒ Claim(s) 10 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☒ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>09/27/2005</u> . | 6) <input type="checkbox"/> Other: ____.  |

## **DETAILED ACTION**

### ***Priority***

1. Acknowledgment is made of applicant's claim for foreign priority based on an application (Application # 0300954-5) filed in Sweden on April 2, 2003. It is noted, however, that applicant has not filed a certified copy of the foreign application as required by 35 U.S.C. 119(b).

### ***Claim Objections***

2. Claim 10 is objected to because of the following informalities: the phrase "depending on parameters affecting on engine operating conditions" is grammatically incorrect. Appropriate correction is required. One possible solution is to replace the phrase with "depending on parameters affecting the engine operating conditions".

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 11 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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5. With regard to claim 11, the claim recites the limitation "the sensors" in the second line of the claim. There is insufficient antecedent basis for this limitation in the claim.

6. With regard to claim 12, the claim recites the limitation "the predetermined boundary value information" in the fifth and sixth lines of the claim. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 101***

7. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

8. Claim 14 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 14 claims a computer program that is not claimed as embodied in computer-readable media (See MPEP 2106.01).

9. Claim 16 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 14 claims a computer program that is "storable" in a computer's internal memory, but the claim does not specify that the program is necessarily embodied in computer-readable media (See MPEP 2106.01).

### ***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 1, 3-8, and 10-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2003/0145582 to Bunting et al. (hereafter referred to as "Bunting") in view of U.S. Patent No. 6,093,223 to Lemaire et al. (hereafter referred to as "Lemaire").

14. With regard to claim 1, Bunting teaches a method of regenerating (reads on *cleaning*) a particle trap exhaust filter during operation of a vehicle that has an internal

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combustion engine, a transmission drivable by said engine, and an exhaust system that includes a filter that receives exhaust from the internal combustion engine (Par. 0001; Par. 0012-0014; Par. 0036; Par. 0042; Par. 0041; Par. 0068; Par. 0077; Figure 1). In the regeneration method of Bunting, the engine controller selects a gear ratio such that the vehicle is operated at a first gear ratio that results in the exhaust gas having a first temperature, and subsequently, the engine controller selects a different gear ratio such that the vehicle is operated at a second gear ratio that results in the exhaust gas having a second, higher temperature (Par. 0077). Bunting teaches that the process of switching gear ratios in order to produce different exhaust gas temperatures results in the proper regeneration of the particle trap filter (Par. 0077).

15. Although Bunting teaches the process of changing the vehicle's gear ratio in order to vary the temperature of the exhaust gas such that the particle trap filter can be cleaned, Bunting does not explicitly teach that such a filter contains different particles that are removed at the different temperatures.

16. Lemaire teaches that the particles trapped in a vehicle's particle trap filter vary in size, and Lemaire teaches that the differently sized particles have different temperatures at which they can be released from the filter (Col. 1, 17-25; Col. 6, 13-47; Table 2).

17. Although Bunting does not explicitly teach that his filter contains different particles that are removed at the different temperatures used in his filter regeneration method, it is known in the art of vehicular particle trap filters that particles having various sizes and various temperatures at which they can be released from the filter are

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accumulated in a vehicle's particle trap filter, and since Bunting teaches that changing the temperature of the exhaust gas by changing the transmission's gear ratio is necessary in order to achieve complete regeneration of the filter, it is expected that differently sized particles are being removed from the filter at the different temperatures in the method of Bunting.

18. With regard to claim 3, in the method of Bunting in view of Lemaire, an engine controller uses the parameters of engine speed and engine load (read on *parameters which affect the operating conditions of the internal combustion engine*) to calculate the volumetric flow of particles (reads on *amount of particles*) generated by the engine, and a regeneration parameter, which is an estimate of the degree of plugging of the filter, is calculated with the computed volumetric flow of particles and the pressure differential across the filter (reads on *filtering characteristic of the filter*; Par. 0046 and 0059 of Bunting).

19. With regard to claim 4, in the method of Bunting in view of Lemaire, the degree of plugging of the filter is estimated by measuring the pressure differential across the filter (reads on *flow resistance in the filter*; Par. 0059 of Bunting).

20. With regard to claim 5, in the method of Bunting in view of Lemaire, the selection of gear ratio in the vehicle transmission depends on a comparison of the regeneration parameter, which is an estimate of the degree of plugging of the filter, and a predetermined desired degree of plugging (reads on *predetermined boundary value information*; Par. 0077 of Bunting).

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21. With regard to claim 6, in the method of Bunting in view of Lemaire, the selected gear ratio is maintained during a time interval, and the selection of gear ratio in the vehicle transmission depends on a comparison of the regeneration parameter, which is an estimate of the degree of plugging of the filter, and a predetermined degree of plugging that is desirable to have at the end of the regeneration process (Par. 0077 of Bunting).

22. With regard to claim 7, Bunting teaches a motor vehicle comprising an internal combustion engine that sends exhaust to an exhaust system comprising a particle trap filter, an engine controller (reads on *control means*), and a transmission drivable by the engine (Par. 0036; Par. 0068). By way of the control means, the motor vehicle is programmed to perform a method of regenerating (reads on *cleaning*) the particle trap exhaust filter (Par. 0077). In the regeneration method of Bunting, the engine controller selects a gear ratio such that the vehicle is operated at a first gear ratio that results in the exhaust gas having a first temperature, and subsequently, the engine controller selects a different gear ratio such that the vehicle is operated at a second gear ratio that results in the exhaust gas having a second, higher temperature (Par. 0077). Bunting teaches that the process of switching gear ratios in order to produce different exhaust gas temperatures results in the proper regeneration of the particle trap filter (Par. 0077).

23. Bunting does not explicitly teach that the particle trap filter has different particle types.

24. Lemaire teaches that the particles trapped in a vehicle's particle trap filter vary in size, and Lemaire teaches that the differently sized particles have different

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temperatures at which they can be released from the filter (Col. 1, 17-25; Col. 6, 13-47; Table 2).

25. Although Bunting does not explicitly teach that his filter contains different particles that are removed at the different temperatures used in his filter regeneration method, it is expected that the particle trap filter has different particle types because it is known in the art of vehicular particle trap filters that such filters accumulate differently sized particles that have different temperatures at which they can be released from the filter. Therefore, the apparatus of Bunting in view of Lemaire satisfies all of the structural limitations of claim 7.

26. With regard to claim 8, the control means of the apparatus of Bunting in view of Lemaire includes a controller for controlling the engine and a controller for controlling the transmission (Par. 0068 of Bunting).

27. With regard to claim 10, in the method of Bunting in view of Lemaire, the control means (applicant's *estimator*) uses the parameters of engine speed and engine load (read on *parameters affecting on engine operating conditions*) to calculate the volumetric flow of particles (reads on *amount of particles*) generated by the engine, and a regeneration parameter, which is an estimate of the degree of plugging of the filter, is calculated with the computed volumetric flow of particles and the pressure differential across the filter (reads on *filtering characteristic of the filter*; Par. 0046 and 0059 of Bunting).

28. With regard to claim 11, in the apparatus of Bunting in view of Lemaire, pressure sensors are arranged to estimate the degree of plugging of the filter depending on the

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pressure differential between the exhaust gas pressure and the ambient pressure (reads on *flow resistance in the filter*; Par. 0059 of Bunting).

29. With regard to claim 12, the apparatus of Bunting in view of Lemaire, the control means performs the selection of gear ratio in the vehicle transmission depending on a comparison of the regeneration parameter, which is an estimate of the degree of plugging of the filter, and a predetermined desired degree of plugging (reads on *predetermined boundary value information*; Par. 0077 of Bunting).

30. With regard to claim 13, in the apparatus of Bunting in view of Lemaire, the control means performs controls the transmission such that the selected gear ratio is maintained during a time interval, and the controller's selection of gear ratio in the vehicle transmission depends on a comparison of the regeneration parameter, which is an estimate of the degree of plugging of the filter, and a predetermined degree of plugging that is desirable to have at the end of the regeneration process (Par. 0077 of Bunting).

31. With regard to claims 14-16, the combination of Bunting in view of Lemaire used to reject claim 7 teaches an algorithm that can be stored in the internal memory of the system controller (reads on *computer*) such that the controller can read and execute the steps of the algorithm, which are the process steps of claim 1 (Par. 0077; Figure 14 of Bunting).

32. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2003/0145582 to Bunting in view of U.S. Patent No. 6,093,223 to Lemaire as applied to claim 1 above, and further in view of U.S. Patent No.

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5,891,409 to Hsiao et al. (hereafter referred to as "Hsiao") in view of U.S. Patent Application No. 2003/0168116 by Brenner et al. (hereafter referred to as "Brenner").

33. With regard to claim 2, the combination of Bunting in view of Lemaire does not teach that the vehicle has a catalytic converter in the exhaust system.

34. Hsiao teaches a catalytic converter for a vehicle's exhaust system that can advantageously convert NO to  $N_2O$  and  $O_2$  (Col. 1, 19-21; Col. 7, line 30 to Col. 8, line 65). As taught by Hsiao, the conversion is advantageous because NO is harmful to the environment (Col. 7, 30-47).

35. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Bunting in view of Lemaire such that the vehicle's exhaust system has a catalytic converter of the type taught by Hsiao that can convert NO to  $N_2O$  and  $O_2$ . The motivation for performing the modification was provided by Hsiao, who taught that NO is harmful to the environment.

36. The combination of Bunting in view of Lemaire in view of Hsiao does not teach that the catalytic converter is upstream of the particle trap filter.

37. Brenner teaches that in a vehicle's exhaust system, it is advantageous to place a catalytic converter upstream of a particle filter because the heat released by the catalytic converter can be advantageously carried downstream by the exhaust gas such that released heat contributes to the regeneration of the particle filter (Par. 0010).

38. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Bunting in view of Lemaire in view Hsiao such that the catalytic converter is upstream of the particle filter. The motivation for performing the

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modification was provided by Brenner, who teaches that it is advantageous to place a catalytic converter upstream of a particle filter because the heat released by the catalytic converter can be advantageously carried downstream by the exhaust gas such that released heat contributes to the regeneration of the particle filter.

39. Further with regard to claim 2, the combination of Bunting in view of Lemaire in view Hsiao in view of Brenner does not explicitly teach that the oxygen generated by the catalytic converter functions to combust particles that are caught in the filter, but since the combination of Bunting in view of Lemaire in view Hsiao in view of Brenner teaches performing the same method steps with the same materials as those claimed by applicant, the effect of having the oxygen function to combust particles in the filter is expected to occur.

40. With regard to claim 9, the apparatus of the combination of Bunting in view of Lemaire does not have a catalytic converter.

41. Hsiao teaches a catalytic converter for a vehicle's exhaust system that can advantageously convert NO to  $N_2O$  and  $O_2$  (Col. 1, 19-21; Col. 7, line 30 to Col. 8, line 65). As taught by Hsiao, the conversion is advantageous because NO is harmful to the environment (Col. 7, 30-47).

42. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the apparatus of Bunting in view of Lemaire such that the vehicle's exhaust system has a catalytic converter of the type taught by Hsiao that can convert NO to  $N_2O$  and  $O_2$ . The motivation for performing the modification was provided by Hsiao, who taught that NO is harmful to the environment.

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43. The combination of Bunting in view of Lemaire in view of Hsiao does not teach that the catalytic converter is upstream of the particle trap filter.

44. Brenner teaches that in a vehicle's exhaust system, it is advantageous to place a catalytic converter upstream of a particle filter because the heat released by the catalytic converter can be advantageously carried downstream by the exhaust gas such that released heat contributes to the regeneration of the particle filter (Par. 0010).

45. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the apparatus of Bunting in view of Lemaire in view Hsiao such that the catalytic converter is upstream of the particle filter. The motivation for performing the modification was provided by Brenner, who teaches that it is advantageous to place a catalytic converter upstream of a particle filter because the heat released by the catalytic converter can be advantageously carried downstream by the exhaust gas such that released heat contributes to the regeneration of the particle filter.

46. Further with regard to claim 2, the combination of Bunting in view of Lemaire in view Hsiao in view of Brenner does not explicitly teach that the oxygen generated by the catalytic converter functions to combust particles that are caught in the filter, but since the combination of Bunting in view of Lemaire in view Hsiao in view of Brenner teaches the same apparatus as that claimed by applicant, the effect of having the oxygen function to combust particles in the filter is expected to occur.

### ***Conclusion***

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47. Any inquiry concerning this communication or earlier communications from the examiner should be directed to RYAN COLEMAN whose telephone number is (571)270-7376. The examiner can normally be reached on Monday-Friday, 9-5.

48. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Kornakov can be reached on (571)272-1303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

49. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/RLC/

Ryan L. Coleman

Patent Examiner, Art Unit 1792

October 8, 2009

/Michael Kornakov/

Supervisory Patent Examiner, Art Unit 1792